

# GREEN SKILLS FOR CITIES

LTP

## Shared lessons

Intro to Urban ecology,  
ecological connectivity  
& data driven design

IAAC

Mathilde Marengo & Iacopo Neri

SECTION ONE

# Context

## Planetary Urbanization

A threat to fine ecological balances

GLOBAL HUMAN FOOTPRINT INDEX V2.

Cartography by Nikos Katsikis, based on data from the Wildlife Conservation Society - WCS, and Center for International Earth Science Information Network - CIESIN - Columbia University, 2005. Last of the Wild Project, Version 2, 2005 (LWP-2); Global Human Footprint Dataset (Geographic). Palisades, New York: NASA Socioeconomic Data and Applications Center (SEDAC).



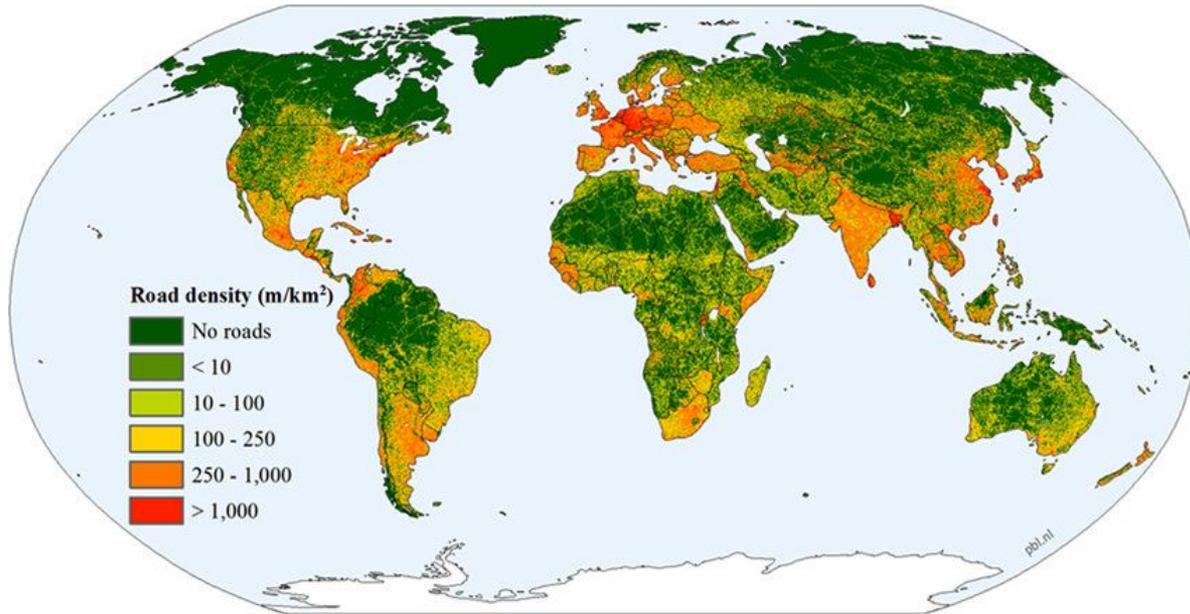
SECTION ONE

# Questioning

## Landscape

## Fragmentation

Urbanities as a drivers for Landscape Fragmentation



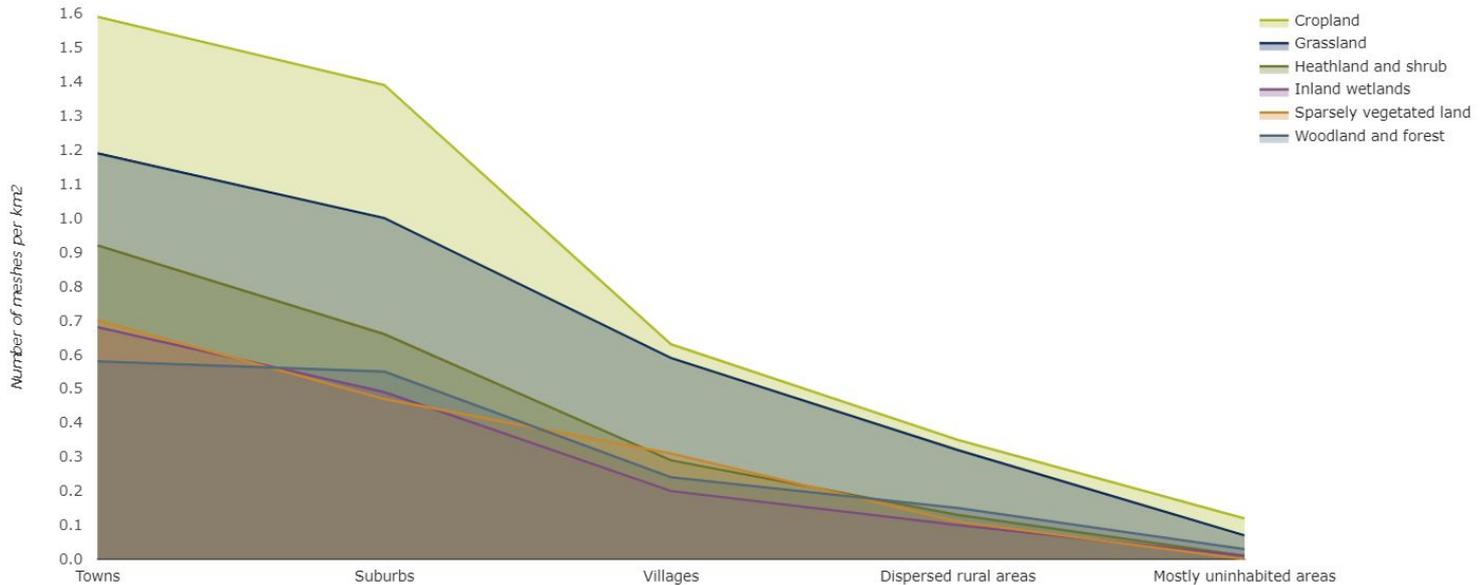
SECTION ONE

# Questioning

## Landscape

## Fragmentation

Urbanities as a drivers for Landscape Fragmentation



\*Landscape Fragmentation by Degree of Urbanisation and MAES Ecosystem Type, 2018, EU-27 and the UK\*, European Environment Agency 2022

SECTION ONE

# Questioning

Can I what is urban, or where the limit of the urban lies, today?

Today **only 3% of the world's surface** is considered **urbanised** (GRUMP).

Yet **70%** is **consumed by human processes**.

# Questioning

Can I what is urban, or where the limit of the urban lies, today?

Today **only 3% of the world's surface** is considered **urbanised** (GRUMP).

Yet **70%** is **consumed by human processes**.

Meaning, the **transformation** from its **“natural” or unprocessed state**, into a state of **alteration through human action**, often linked to a form of **consumption**, whether this be related to **physical or informational resources**.

SECTION ONE

# Questioning

Can I define what is  
natural today?

SECTION ONE

# Questioning

Is this “**natural**”?

Riau, Indonesia

SECTION ONE

# Questioning

Is this “**natural**”?

Riau, Indonesia



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SECTION ONE

# Questioning

Is this “natural”?

Amazon Rainforest



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# Questioning

Can I define what is natural today?

**Anthropocene geological age**, where **human activity** is the **dominant influence** on **climate and the environment**.

We are therefore in a moment where **the capacity to distinguish the natural from the artificial** is **debatable**.

# Questioning

Is everything urban today?

**Anthropocene geological age**, where **human activity** is the **dominant influence** on **climate and the environment**.

We are therefore in a moment where **the capacity to distinguish the natural from the artificial** is **debatable**.

“Metropolises are also seen as places where the state of the **relationship between global trends, space and society** are **most legible and their effects**, both physical and social, for better or for worse, most spectacular.” (Bocquet, 2013)

SECTION ONE

## Questioning

How can we design for the limitless urban without compromising habitat resilience?

How can we design in this condition of constant uncertainty?

Which key concepts should we explore through design?

SECTION TWO

# Methodologies

How to design in / for uncertainty towards  
climate change adaptation?

Concepts

Battle i Roig, The Vall d'en Joan landfill project

SECTION TWO

# Methodologies

→ Multiscalar design &  
Systemic design

Approaching design at multiple scale to include multiple natural and social dynamics **from the street section to the territory.**

# Methodologies

- Multiscalar design & Systemic design
- Including time in design processes

Exploiting **digital simulations** as material for design proposal, aiming to **open ended solutions** and ensuring **adaptability** in design

# Methodologies

- Multiscalar design & Systemic design
- Including time in design processes
- Exploring more-than-human design possibilities

Who are we designing for?

Including **non-human actors** in the design process.

Considering “**nature**” as an **active partner** and not as a passive observer.

SECTION TWO

# Design Methodologies - examples

## Freshkills

James Corner Field Operations

## Park



<https://www.fieldoperations.net/project-details/project/freshkills-park.html>

SECTION TWO

# Design Methodologies - examples

## Freshkills

James Corner Field Operations



<https://www.fieldoperations.net/project-details/project/freshkills-park.html>



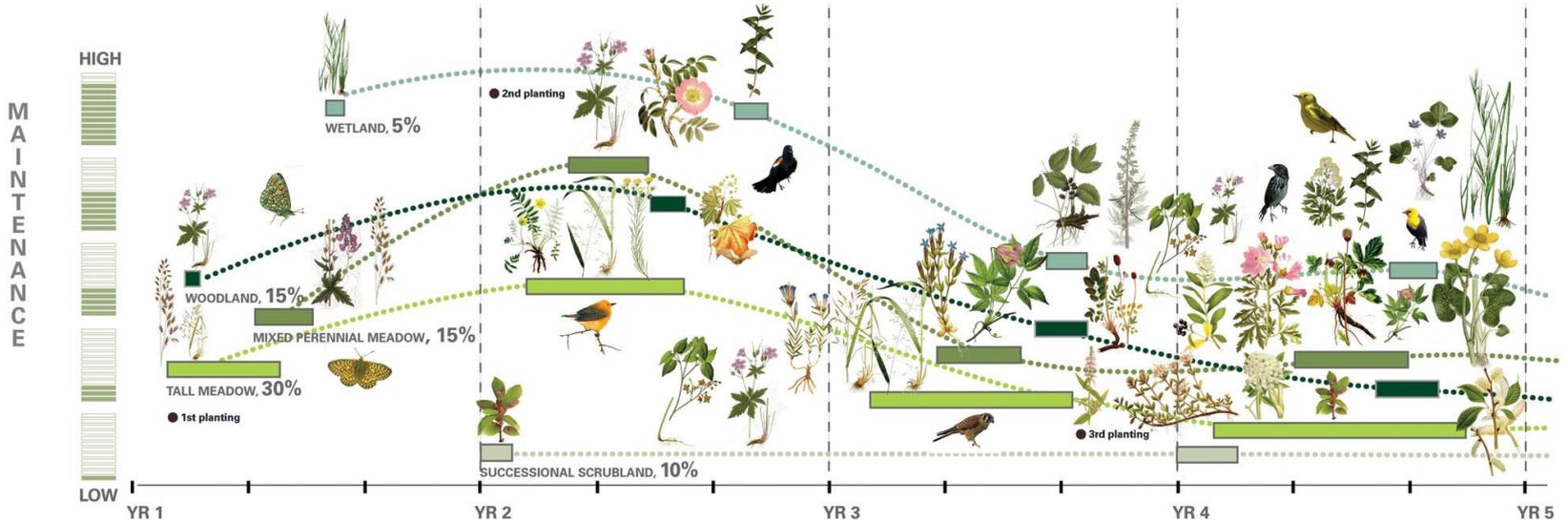
SECTION TWO

# Design Methodologies - examples

## Freshkills

## Park

James Corner Field Operations



DIVERSIFICATION IN TIME [STABILIZED MAINTENANCE / ENHANCED BIODIVERSITY]

<https://www.fieldoperations.net/project-details/project/freshkills-park.html>

SECTION TWO

# Design Methodologies - examples

Freshkills

Park

James Corner Field Operations



<https://www.fieldoperations.net/project-details/project/freshkills-park.html>

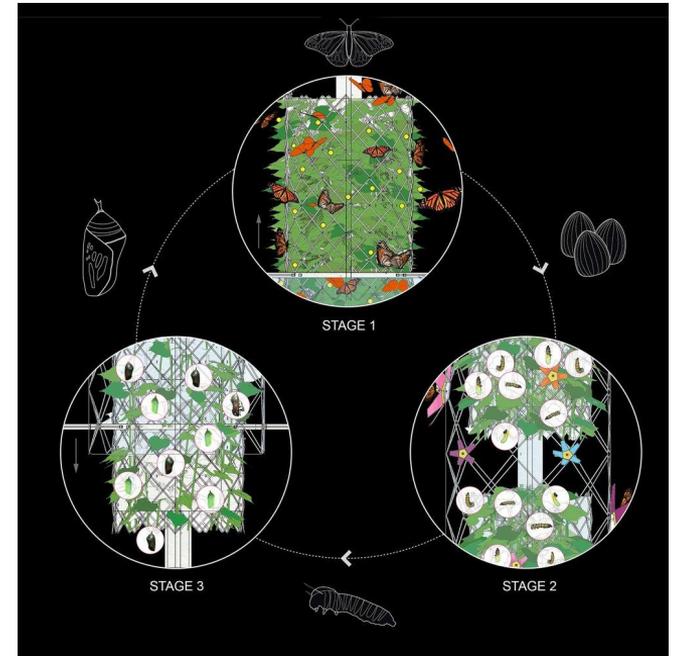
SECTION TWO

# Design Methodologies - examples

Monarch

Sanctuary

TerreformONE



<https://www.terreform.org/monarch-sanctuary>



SECTION TWO

# Design Methodologies - examples

Monarch

TerreformONE



<https://www.terreform.org/monarch-sanctuary>

SECTION THREE

# Digital tools

Simulations and computation to support design

What is the role of digital technology in all this?

M.Marengo, I.Neri, Ecological Connectivity study for Barcelona



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## Digital tools

How digital technologies support design in times of uncertainty?

**Digital technologies can enable designers** to approach **landscape** under a **dynamic, collective, multidisciplinary and multiscalar perspective**

## Digital tools

How digital technologies support design in times of uncertainty?

Data informed design

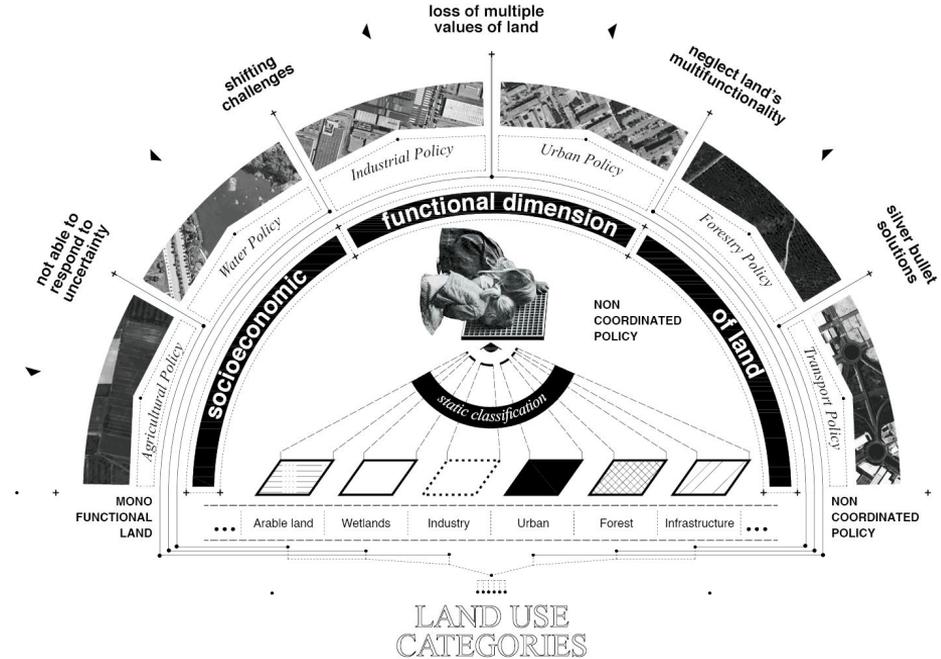
**Digital technologies can enable designers** to approach **landscape** under a **dynamic, collective, multidisciplinary and multiscalar perspective**

**Eco-intelligent      Territorial      Planning**  
Dynamic mapping based on multi-functional land values, measuring land use resilience for climate adaptive spatial planning.

SECTION THREE

# Digital tools

## Eco-intelligent Territorial Planning

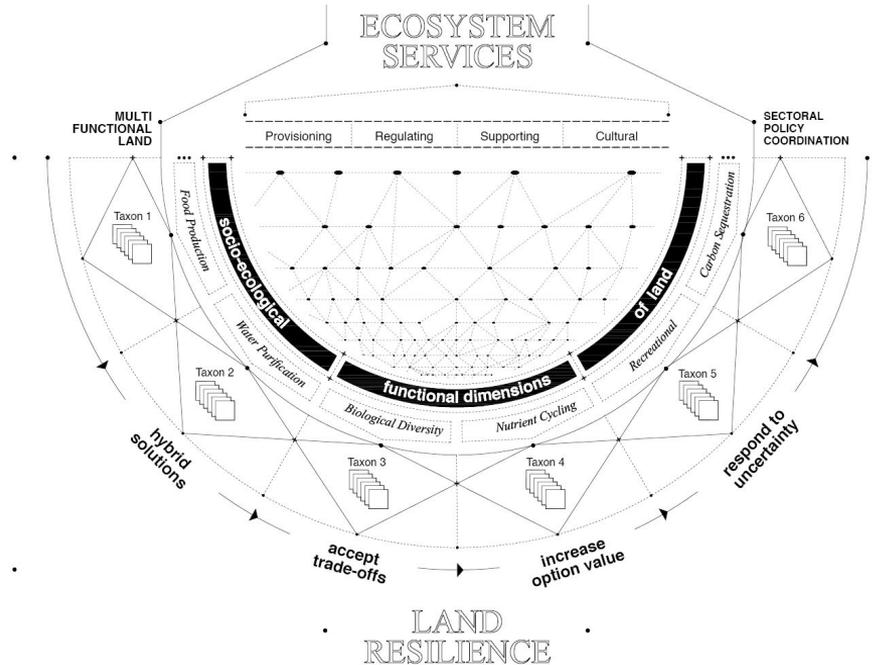


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SECTION THREE

# Digital tools

## Eco-intelligent Territorial Planning

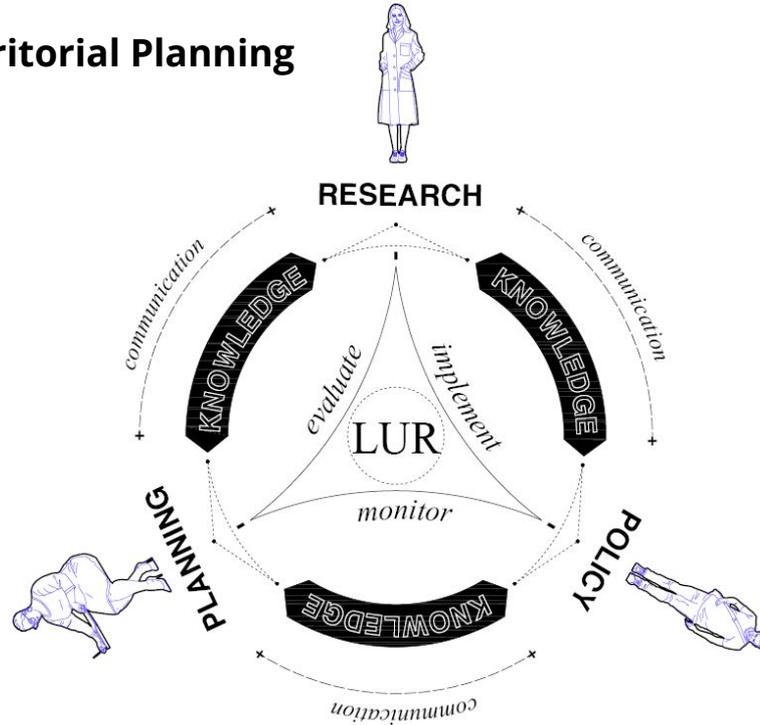


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# Digital tools

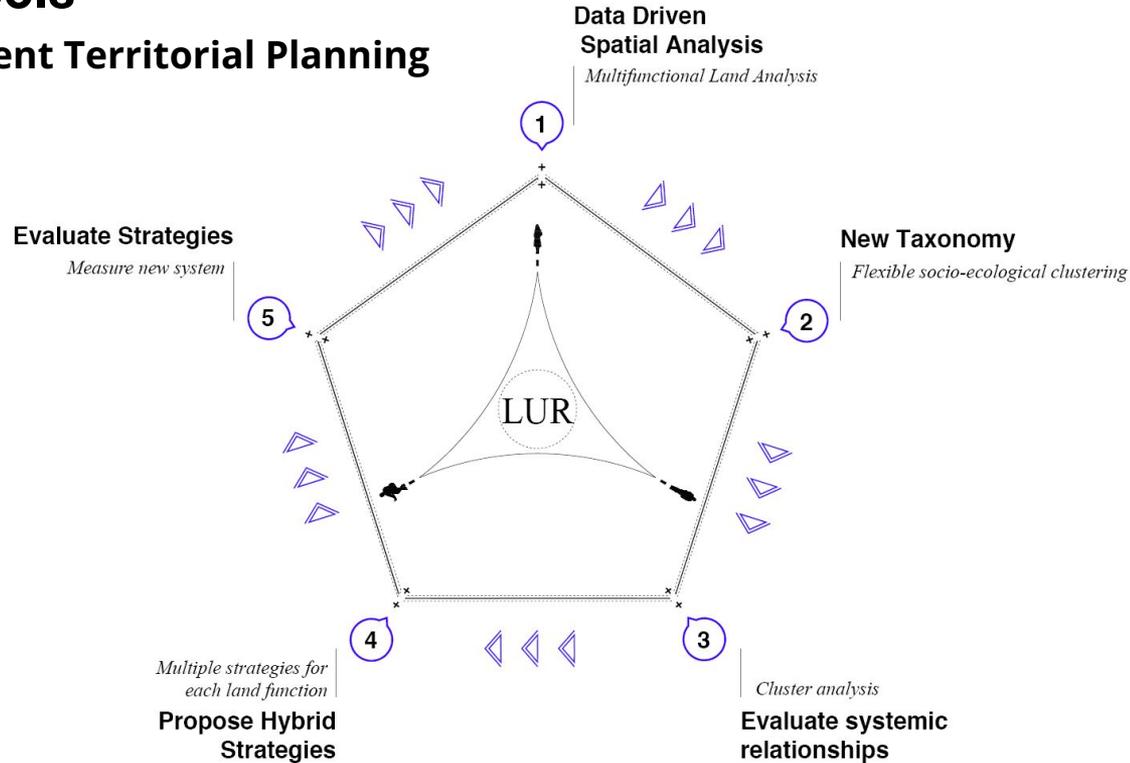
## Eco-intelligent Territorial Planning



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# Digital tools

## Eco-intelligent Territorial Planning

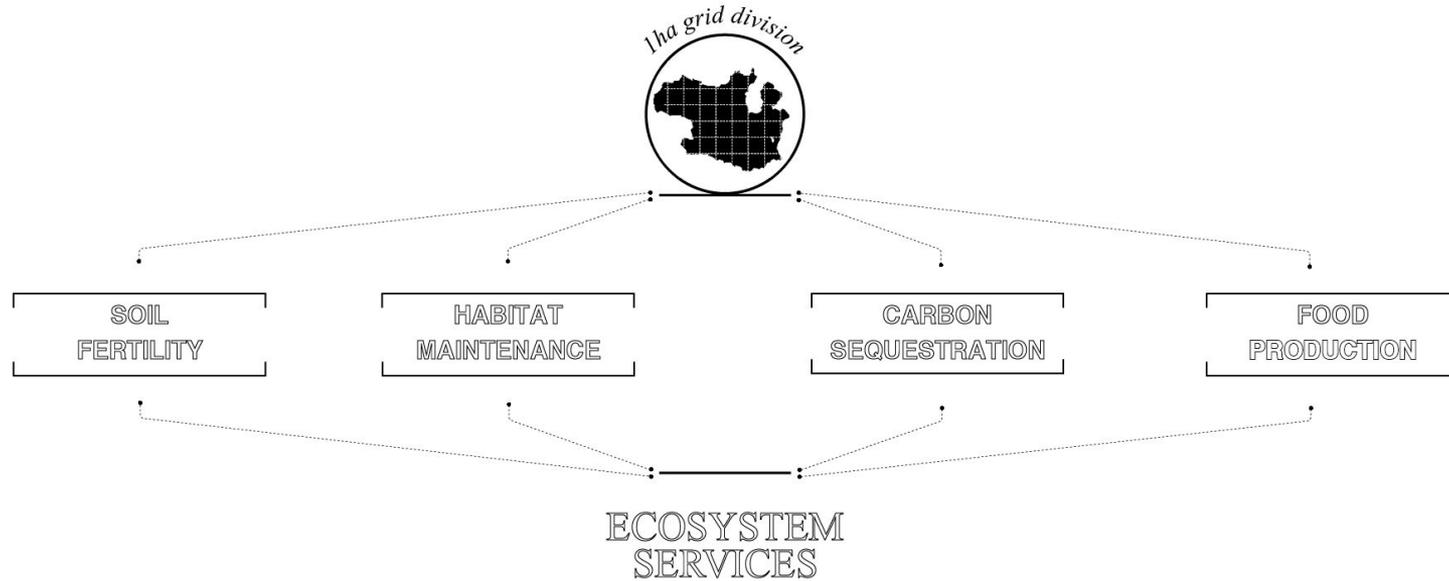


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SECTION THREE

# Digital tools

## Eco-intelligent Territorial Planning

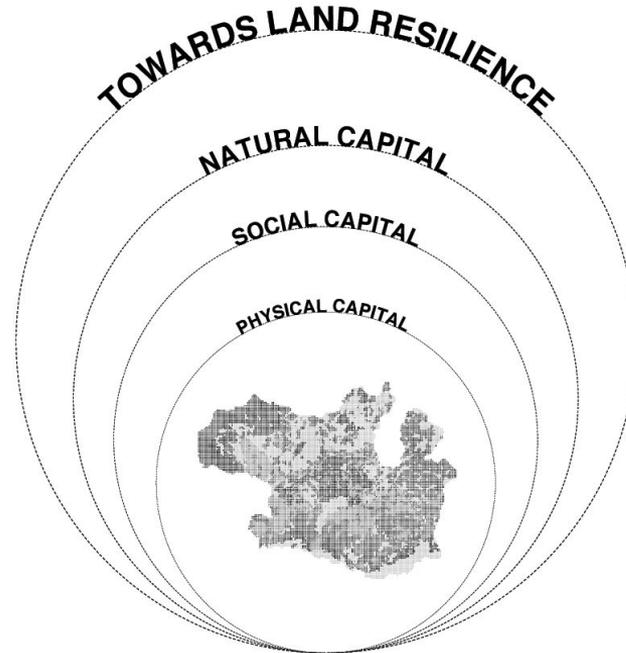


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SECTION THREE

# Digital tools

## Eco-intelligent Territorial Planning



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## Digital tools

How digital technologies support design in times of uncertainty?

Can the **access** to **ecological data sets**, embedded into design processes, allow **nature** to have an **active voice in design** to **empower ecological connectivity in urbanised areas**?

## Digital tools

How digital technologies support design in times of uncertainty?

We have developed a methodology that empowers designers to engage with nature as an active partner in the process of urban design. The goal is to support the design of **Urban Ecological Connectivity**.

To do this we **reconsidering the polarisation between ecological forces** and anthropocentric ones, providing an opportunity to consciously **design for, and within, climate change adaptation** through ecological connectivity.

SECTION THREE

# Digital tools

## Designing with Nature

Detecting and amplifying potential and beneficial connections towards breathing cities

Barcelona



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# Digital tools

## Habitat Resilience

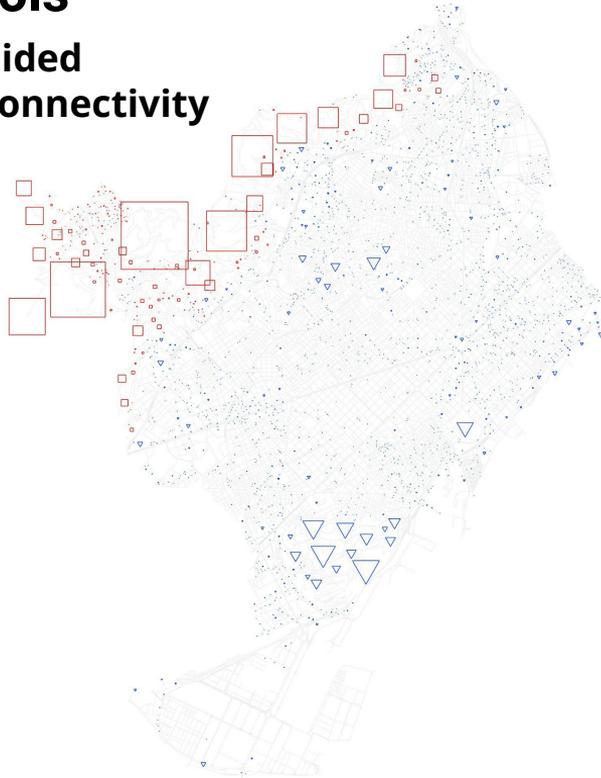
Fostering ecological connections to enhance vital ecosystem services

"Internet of Mediterranean Ecologies" by Marengo M., Neri I., Farinea C.  
in M. Marengo, I. Neri, C. Farinea (2022), Internet of Ecologies,  
in M. Ricci, M. Pasquali, S. Mannocci (Eds.) MedWays Open Atlas, letteraventidue, Siracusa, ISBN 9788862427357, pp. 83-91

SECTION THREE

# Digital tools

## Computer-aided Ecological Connectivity



Graph green nodes

 *Forest patches*

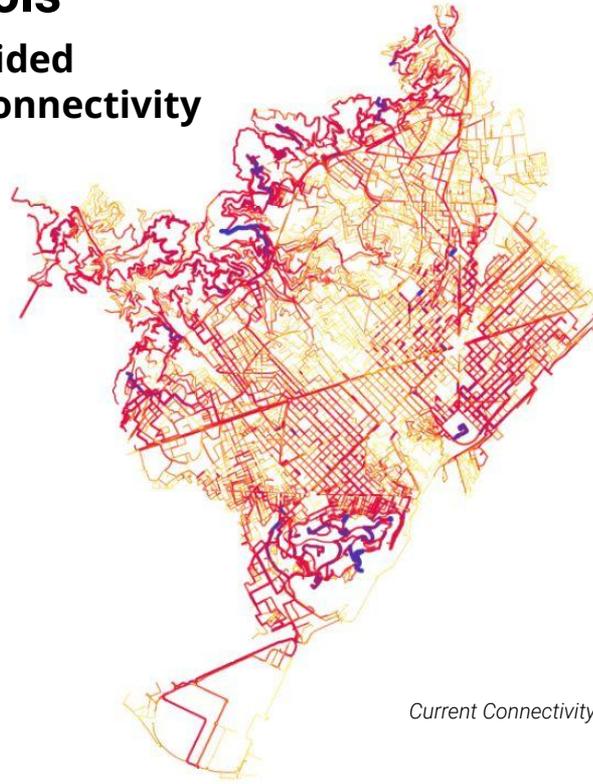
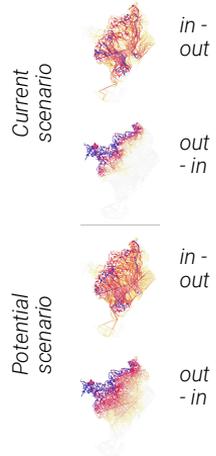
 *Urban pockets*

M.Marengo, I.Neri, Computer-aided ecological connectivity for urban design within climate change adaptation, in press ACADIA 2023

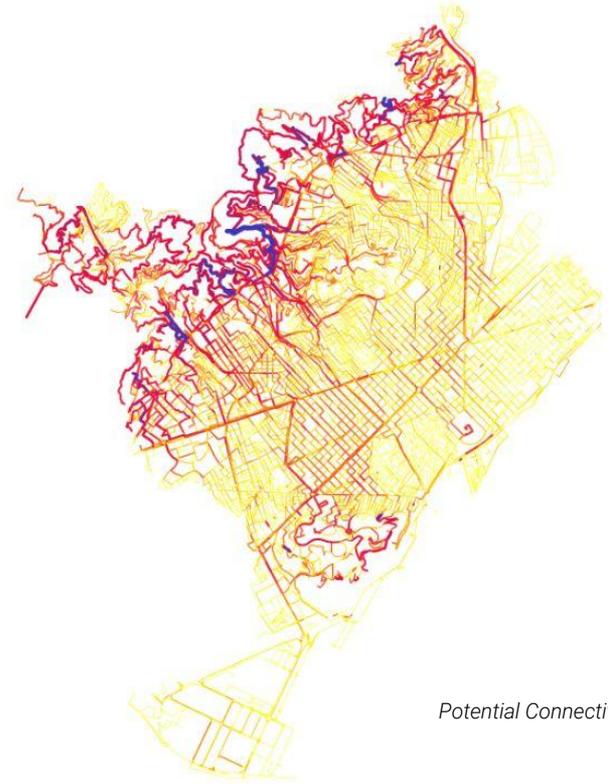
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# Digital tools

## Computer-aided Ecological Connectivity



Current Connectivity



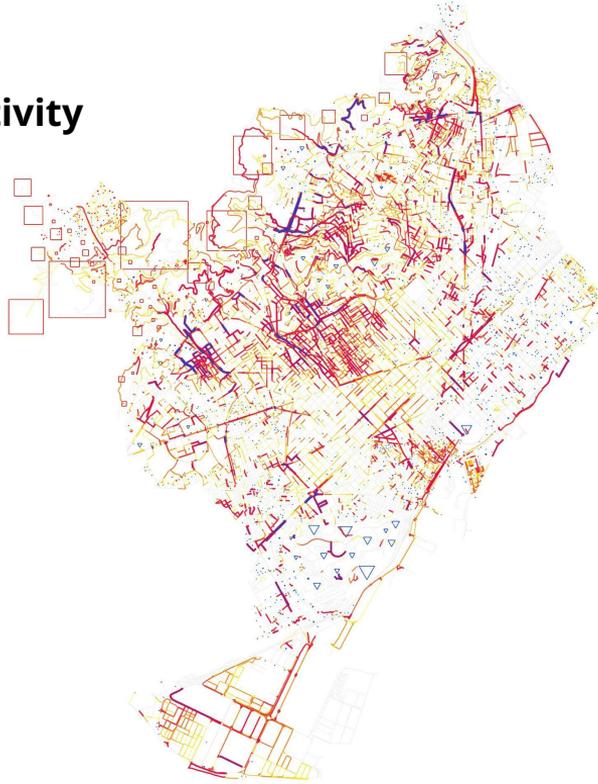
Potential Connectivity

M.Marengo, I.Neri, Computer-aided ecological connectivity for urban design within climate change adaptation, in press ACADIA 2023

SECTION THREE

# Digital tools

## Computer-aided Ecological Connectivity



Priority map

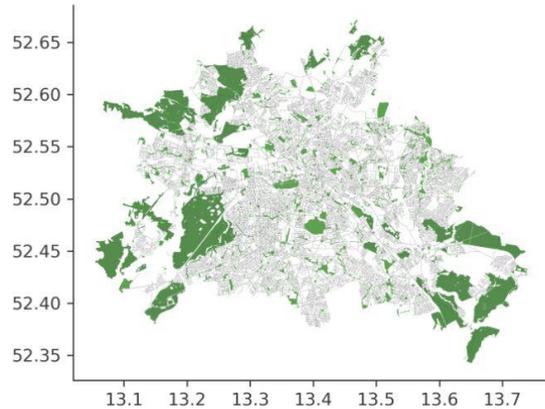
- Low priority*
- Medium priority*
- High priority*
- Top priority*

M.Marengo, I.Neri, Computer-aided ecological connectivity for urban design within climate change adaptation, in press ACADIA 2023

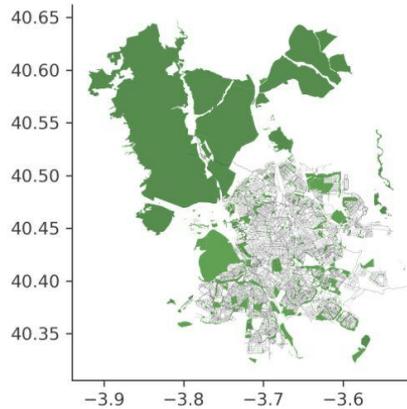
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# Digital tools

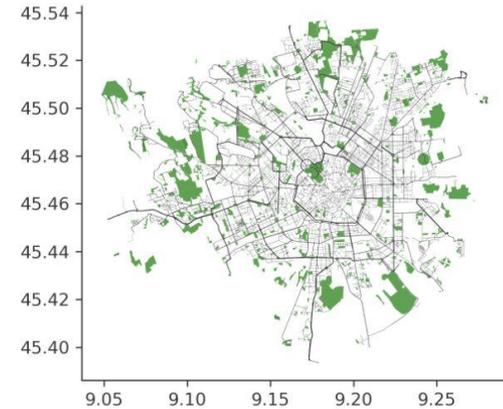
## Computer-aided Ecological Connectivity



*Berlin  
(Germany)*



*Madrid  
(Spain)*



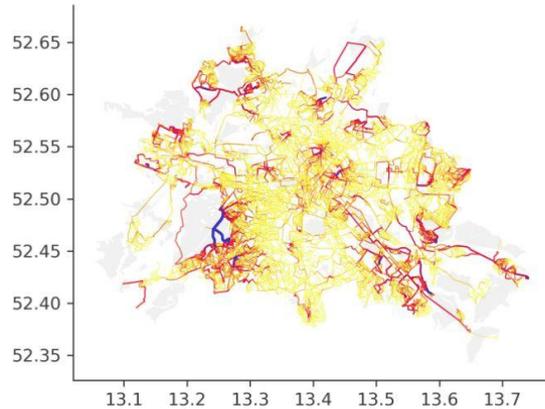
*Milan  
(Italy)*

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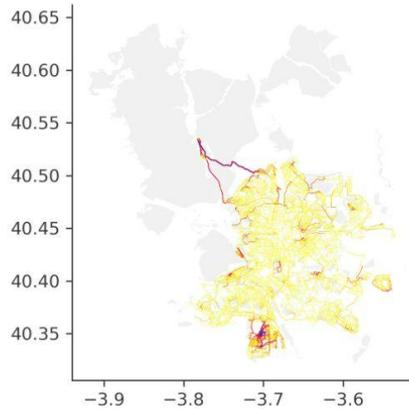
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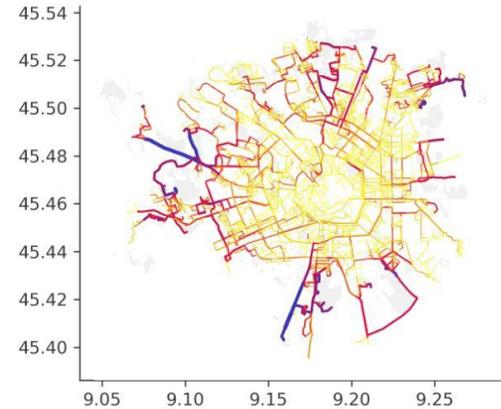
## Computer-aided Ecological Connectivity



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*Madrid  
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*Milan  
(Italy)*

M.Marengo, I.Neri, Computer-aided ecological connectivity for urban design within climate change adaptation, in press ACADIA 2023

NEXT CLASS

In Lesson number 2 we will look into the **application** of the **methodological considerations** and **digital tools** discussed in this class within the context of diverse **European Cities**.

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Or check out our website:

<https://greenskills4cities.eu/>